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May 7, 2010

Dennis J. McLerran, Regional Administrator
U.S. Environmental Protection Agency, Region 10
Regional Administrator's Office, RA-140
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

Re: Secondary effects on subsistence and recreational use from a potential Pebble mine.

Dear Mr. McLerran:

I and my co-counsel represent several federally-recognized Tribes that, in accompanying correspondence, have requested EPA to initiate a public process under Section 404(c) of the Clean Water Act to identify and designate waters and wetlands in the Kvichak and Nushagak river drainages of Southwest Alaska where discharge of dredge and fill material associated with metallic sulfide mining, such as a potential Pebble mine, could be prohibited or restricted.

Much of the discussion of a potential Pebble mine focuses, understandably, on risks to commercial salmon fisheries. This letter focuses on risks to subsistence and recreation, in order to draw a distinction.

A distinction is this: Injury to commercial fishing depends, for the most part, on events such as acid mine drainage, other pollution, dam failure, genetic loss, etc. that would be secondary effects to discharges of dredge and fill into waters and wetlands. Injury to subsistence and some recreation can occur not only by such means, but also by other secondary effects such as increased competition due to increased use, population, access, crowding, etc. Thus, while such discharges for a Pebble mine (or similar metallic sulfide mine) inevitably will have direct and cumulative effects where the discharges occur, this letter focuses on impacts that are *likely* to result, secondarily and in combination with other impacts (of increased use, access, etc.), in a significant loss or damage to subsistence and recreational use of fish and wildlife.

I. Summary of the 404(c) Regulations and the 404(b)(1) Guidelines.

The 404(c) regulations define an "unacceptable adverse effect" as

> impact on an aquatic or wetland ecosystem which is *likely* to result in . . . significant loss of or damage to fisheries, . . . , or wildlife habitat or recreation areas. In evaluating the unacceptability of such impacts, consideration should be

> given to the relevant portions of the section 404(b)(1) guidelines (40 CFR part 230).[1]

The purposes of the Guidelines are "to restore and *maintain* the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material,"[2] and to implement Congressional policies expressed in the Clean Water Act.[3] The Guidelines establish a rebuttable presumption against allowing any discharge:

> Fundamental to these Guidelines is the *precept* that dredged or fill material should not be discharged into the aquatic ecosystem, *unless* it can be demonstrated that such a discharge will not have an unacceptable adverse impact *either individually or in combination* with known and/or probable impacts of other activities affecting the ecosystems of concern.[4]

Thus, the Guidelines prohibit a discharge whenever it results, "either individually or in combination" with other known or probable impacts, in an unacceptable adverse impact. The Guidelines further declare:

> From a national perspective, the degradation or destruction of special aquatic sites, such as filling operations in *wetlands*, is considered to be among the most *severe* environmental impacts covered by these Guidelines. The *guiding principle* should be that degradation or destruction of special sites [such as wetlands] may represent an irreversible loss of valuable aquatic resources.[5]

The 404(b)(1) Guidelines address direct, cumulative and secondary effects.[6] Cumulative effects are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material.[7] Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material.[8] Information about secondary effects must be considered prior to a final decision under Section 404.[9] Secondary effects may present issues of greater

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[1] 40 CFR 231.2(e) (italics added). The 404(b)(1) Guidelines (40 CFR Part 230) are promulgated by the EPA in conjunction with the Secretary of the Army acting through the Chief of Engineers under Section 404(b)(1) of the Clean Water Act. 40 CFR 230.2.
[2] 40 CFR 230.1(a) (italics added).
[3] 40 CFR 230.1(b).
[4] 40 CFR 230.1(c) (italics added).
[5] 40 CFR 230.1(d) (italics added). Wetlands are a "special aquatic site." 40 CFR Part 230, subpart E.
[6] 40 CFR 230.11.
[7] 40 CFR 230.11(g)(1).
[8] 40 CFR 230.11(h)(1).
[9] *Id.*

significance than direct effects.[10] The Guidelines address effects on human use of resources.[11] In practice, this includes secondary effects on such uses.[12]

II. Overview of the Economic Uses of Fish and Wildlife in the Bristol Bay Area.

The most recent study of economic values associated with salmon of the Bristol Bay drainages is: John Duffield[13] et al., *Economics of Wild Salmon Watersheds: Bristol Bay, Alaska*, listed in the Appendix to the Tribes' letter requesting a 404(c) process.[14] According to Duffield, et al., the economy of the Bristol Bay region depends on three main types of activities – publicly funded services (government plus non-profits), activities associated with the commercial exploitation of the natural resources of the region (commercial fishing and recreation), and subsistence.[15]

With respect to commercial salmon fishing, Duffield estimates that commercial salmon caught in Bristol Bay in 2005 had a wholesale value of $226 million in the regional economy.[16]

With respect to subsistence, Duffield estimates that subsistence harvest of fish and game, by approximately 7600 people residing in the Bristol Bay drainages, accounts for 2.4 million pounds of subsistence harvest per year for an average of 315 pounds per person annually,[17] and that this results in an estimated net economic value annually of between $78 and $143 million.[18]

With respect recreation, Duffield estimates that in 2005 the fish and wildlife in these drainages accounted for nearly 51,000 recreational trips,[19] which generated $91 million in

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[10] 40 CFR 230.41(b) ("minor loss of wetland acreage may result in major losses through secondary impacts").
[11] 40 CFR Part 230, Subpart F.
[12] An example of a previous EPA action under 404(c) that addresses secondary effects on human use of resources is the Recommended Determination of [EPA Region IV] Pursuant to Section 404(c) of the Clean Water Act Concerning the Yazoo Backwater Area Pumps Project (June 23, 2008).
[13] Dr. Duffield, PhD, is a professor of natural resource economics at the University of Montana and is a co-author of the treatise: Ward, Kevin M. and John W. Duffield, 1992, *Natural Resource Damages: Law and Economics*, New York, John Wiley & Sons.
[14] Page citations herein are to the full study list in the Appendix to the Tribes' letter to EPA re 404(c). A shorter version of the study was published in USDA Forest Service Proceedings RMRS-P-49 (2007).
[15] Duffield et al., at 93.
[16] Duffield et al., at 16. The "economic value" of commercial salmon fishing in Bristol Bay can be estimated by various values, such as ex-vessel value, expenditure value, wholesale value, net profit, etc., in various geographical contexts, such as a local, regional, or national economy. See Duffield generally.
[17] Duffield et al., at 84 – 85.
[18] Duffield et al., at 107 – 108.
[19] Duffield et al., at 99.

expenditures.[20] With respect to sport fishing, it is roughly divided between 65% trips to the area by Alaska residents and 35% trips by nonresidents.[21] When sport fishing was the sole or primary purpose of a trip, the sport fishing accounted for $61 million in expenditures.[22] Of that amount, $48 million were expenditures by the one-third of sport fishers who are non-residents of Alaska.[23]

With respect to employment, the following table from Duffield, et al. reflects the distribution of full-time-equivalent jobs.

Total Full Time Equivalent (FTE) Employment in Alaska Dependent on Bristol Bay Wild Salmon Ecosystems, 2005[24]

Sector	*Alaska Residents*			*Nonresidents*	*Total FTE jobs*
	Local residents	Non-local residents	Total Alaska		
Commercial fishing	689	667	1,357	1,172	2,529
Commercial processing	465	449	914	796	1,710
Sport fishing	288	435	723	123	846
Sport hunting	60	105	165	2	167
Wildlife viewing / tourism	82	139	222	17	239
Subsistence	14	34	49	0	49
Total FTE jobs	1598	1829	3,430	2,110	5,540

III. Secondary Effects on Subsistence and Recreational Use of Fish and Wildlife.

A Pebble mine, and associated development and access, are likely to increase competition for subsistence and recreational use of fish and game in the Bristol Bay drainages. At various times, the Pebble Limited Partnership (PLP) has asserted that a Pebble mine will require several thousand workers to build it, and a thousand workers to operate it, though PLP's estimates of the number of workers fluctuate. This increased activity inevitably will bring additional residents to the area in other roles, also. Even if mining permit stipulations could protect fish and wildlife habitat outside of the sites at which dredge and fill material would be discharged, significant increases in demand for fish and game resources, in access demands, and in secondary development are likely to increase competition for fish and game.

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[20] Id.

[21] Duffield et al., at 15.

[22] Duffield et al., at 15, 101.

[23] Id.

[24] Duffield et al., at 17. Hunting is included because wild salmon returning from the sea perform an "ecosystem service" of nutrient recycling to support habitat functions. See id. at 24-26. In Alaska, marine nitrogen accounts for as much as 90 percent of the nitrogen in brown bears. See Robert J. Naiman et al., Riparia: Ecology, Conservation, and Management of Streamside Communities, 184-185 (2005).

For purposes of Section 404(c) and the 404(b)(1) Guidelines, EPA may consider the quality of subsistence and recreational use and socio-economic impacts resulting from changes in subsistence and recreational use patterns.[25]

A. Subsistence and Environmental Justice.

In the Bristol Bay drainages, the share of the population that is Alaska Native is relatively high at 70 percent, compared to Alaska as a whole, with 16 percent.[26] Accordingly, subsistence is a major concern to the Tribes, and so, the Appendix to the Tribes's letter to EPA on 404(c) provides internet links to maps (used by the Bureau of Land Management) which identify subsistence use areas for the villages and communities in the area that use the Kvichak and Nushagak drainages for subsistence. The demographic aspects raise issues of environmental justice under Executive Order 12898. It requires that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on low-income and minority populations.

Most of the central provisions of State and federal subsistence laws were drafted nearly thirty years ago. Both provide two "tiers" of a subsistence preference (16 U.S.C. § 3114; AS 16.05.258), but they differ with respect to who can participate. Federal law limits subsistence on federal lands to *rural* Alaska residents. State law allows *all* Alaskans to qualify, preliminarily, for subsistence on non-federal lands.[27] Under both schemes, when the total harvest by subsistence and other users of a fish or game stock exceeds sustained yield, the Tier I preference restricts or eliminates non-subsistence users. When the subsistence harvest alone exceeds sustained yield, the Tier II preference is triggered and subsistence is restricted by statutory criteria that allocate subsistence opportunities. On federal lands, 16 U.S.C. § 3114 allocates subsistence opportunities by three criteria: (1) customary and direct dependence on the populations as the mainstay of livelihood; (2) local residency; and (3) availability of alternative resources. The State, however, must avoid local residency criteria as being unconstitutional under the Alaska Constitution. These distinctions in who can hunt and fish in particular situations have divided Alaskans and are known colloquially as the "subsistence dilemma."[28]

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[25] See e.g., USEPA, Recommended Determination pursuant to Section 404(c) Concerning the Yazoo Backwater Area Pumps Project, *supra* (portions address potential changes in quality of, and economic benefits derived from, fishing and hunting in the Yazoo Backwater Area).

[26] John Duffield et al., Economics of Wild Salmon Watersheds: Bristol Bay, Alaska 11 (2007).

[27] *McDowell v. State*, 785 P.2d 1 (Ak. 1989) (Alaska constitution bars State from limiting subsistence to rural residents).

[28] A Pebble mine may increase pressure (which already exists) to revise federal subsistence law to be protect only Alaska Native people, and to apply it more broadly than only on federal land (*i. e.*, to Native corporation lands also). Congress probably could adopt a "Native only" subsistence provision under the Indian Powers clauses of the US Constitution, but the Alaska legislature cannot under the Alaska Constitution. Doing so would drive state and federal governments further apart on subsistence law, and would be very divisive among state residents. A proposed Pebble mine is likely to add to pressures to do so.

A potential Pebble mine is likely to be caught upon the horns of this dilemma, because the Bristol Bay drainages (unlike locations of other large mines in Alaska) are the source of world-class fish and game resources (*e.g.*, salmon, trout, char, grayling, pike, lake trout, caribou, moose, and bears) that attract users locally, regionally, nationally, and internationally. No other large Alaskan mine is located in a region that does so. This distinction implies that Pebble and associated development are likely to result in increasing the numbers of new local rural residents, visitors from Alaska and perhaps elsewhere, and the amount of secondary development.[29] Because of the land ownership pattern, new local residents are likely to settle in the vicinity of Iliamna, Newhalen and Nondalton. However, their uses of lands and resources will reach beyond, to state lands in the Kvichak and Nushagak drainages (and to private land, including Native land, with and without permission) where state subsistence law applies, and to federal land (Lake Clark and Katmai nationals parks and preserves, and BLM lands) where federal subsistence law applies. The Pebble Partnership may restrict fishing or hunting by employees while at the mine site, but it cannot limit development of private land, or the activities of new local residents who are either not its employees, or are visitors. Even well-intentioned restrictions on access to protect subsistence uses of resources tend to be transitory and ineffective (*e.g.*, the Dalton Highway, formerly "the North Slope Haul Road" is now open to public use).

With respect to federal law, the *new* local residents will be *rural* residents for purposes of subsistence in federal parks and preserves and BLM lands. They will compete with both *current rural residents* engaged in subsistence and *sport hunters* who visit the area. First, as the *total* subsistence demand increases due to new *rural* residents, Federal subsistence law, first, will restrict or eliminate sport hunting in the federal Lake Clark and Katmai Preserves (where sport hunting has been allowed). Second, when subsistence demand of all (new and current) rural residents surpasses sustained yield of a fish or game population (most likely a game population) on federal land, some rural residents will be disqualified under the criteria at 16 U.S.C. § 3114. However, the local-residency criterion will not be particularly effective, because new and current rural residents will *all* be "local rural residents." The first and third criteria – *i.e.*, (1) customary and direct dependence as the mainstay of livelihood; and (3) availability of alternative resources – will disqualify some subsistence users on federal lands, not unlike the disqualification that occurs under the State's divisive and controversial Tier II hunts. Hence, *current* rural residents would experience increased competition, diminished subsistence opportunity, and disqualification on federal lands, because of an influx of *new* rural residents.

With respect to state subsistence law, conflicts are likely to be more intense because all Alaska residents can qualify for subsistence on nonfederal lands. Some game populations, such as Mulchatna caribou and Nushagak moose, may have to be managed as Tier II state subsistence hunts, in which all sport hunters and many subsistence hunters would be excluded.

Thus, the discharge of dredge and fill material for a Pebble or similar mine is likely to result, in combination with other impacts, in a significant loss of subsistence by current subsistence users. Furthermore, because the population in the Bristol Bay drainages is substantially Native Alaskan, a Pebble mine (or similar metallic sulfide mine) is likely to have

[29] For reasons addressed in Part B below, additional visitors may not result in less, not more recreational expenditures.

disproportionately high, adverse, *secondary*, environmental effects, in combination with other impacts, on subsistence use by Alaska Natives in the Kvichak and Nushagak drainages. This raises issues of environmental justice under Executive Order 12898. Again, the Yazoo Backwater Area Pumps Project (see fn. 12, *supra*) provides analogy. In that case, EPA concluded that the project would have disproportionate adverse effects on subsistence fishing and hunting activities of low-income and minority populations, and that a 404(c) decision to bar the project would not.[30]

B. Sport Fishing.

Most recreational sport fishing trips in the area are by local residents,[31] even though they do not account for most of the expenditures. With respect to sport fishing expenditures, the Duffield study is consistent with others published in the 1980's. Generally speaking, the studies have found or implied that two factors drive expenditures for services of remote fishing lodges in the Bristol Bay drainages: (1) desire for large rainbow trout as a target species, ahead of king salmon, silver salmon and other species, and (2) concern about crowding.[32] Most of the commercial lodges and camps are located in the Kvichak and Nushagak drainages.[33]

Duffield compared sport fishing in the Bristol Bay drainages to sport fishing on the Kenai Peninsula. Anglers fishing the road-accessible Kenai Peninsula generally were less concerned with crowding or desire to fishing remote roadless areas than were anglers in the Bristol Bay drainages,[34] and were more likely to pursue salmon.[35] According to Duffield, these findings are consistent with the general finding from Romberg (1999), that there are different market segments of Alaskan sport fishing, and that different types of waters attract different types of anglers.[36] Sport fishers on the Kenai Peninsula are generally over 50 percent Alaska residents.[37]

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[30] USEPA, Recommended Determination pursuant to Section 404(c) Concerning the Yazoo Backwater Area Pumps Project, *supra*, at 65 – 67.

[31] Duffield, et al., at 51 (estimated 19,488 sport fishing trips by Bristol Bay area residents versus 12,966 sport fishing trips by non-residents of Alaska).

[32] Duffield, et al., at 46 – 48 (large rainbow trout viewed as over 26 inches in survey). See also Jon Issacs & Associates, "Commercial Recreation Service Providers Study" (1986) for Bristol Bay Coastal Resource Serv. Area (focuses on Nushagak/Mulchatna drainage); D. A. Ackley, "An Economic Evaluation of Recreational Fishing in Bristol Bay, Alaska," Masters Thesis, UAA/Juneau (1988) (focuses on Kvichak/Naknek drainages; includes Iliamna Lake area).

[33] The authors can provide a copy of the State's "Bristol Bay Area Plan Planning Regions, Recreation Lodges & Camps" (2005) prepared for the State's 2005 Bristol Bay Area Plan but not published in the Plan itself.

[34] Duffield, et al., at 43.

[35] Duffield, et al., at 45.

[36] Id.

[37] ADF&G, Fishery Data Series, No. 09-47, "Estimates of Participation, Catch, and Harvest in Alaska Sport Fisheries in 2005, 37 (In this Data Series "Southcentral Alaska" includes the Bristol Bay drainages, and non-residents fishing in all of Southcentral Alaska generally account for less than 50 percent of anglers from 2000 to 2005. Thus, sport fishers in the Bristol Bay drainages are disproportionately non-residents.)

In contrast, sport fishers who purchase "trip package" services of the lodge, guiding and air taxi industries in the Bristol Bay drainages, and who account for a disproportionately greater share of expenditures, are closer to 80 percent non-residents.[38]

Duffield addresses potential development within the area that could result in road access (by ferry from Homer, Alaska) and thus would impact crowding and size and abundance of rainbow trout in the region.[39] The survey indicates that 45.4% of non-residents and 30.5% of residents feel that the road access would cause them to either stop fishing in the Bristol Bay area (and fish other areas of Alaska) or stop fishing in Alaska entirely.[40] Nearly 80 percent of non-resident lodge clients responded that they oppose developing road access in Bristol Bay area, and nearly 60 percent responded that they would not fish the Bristol Bay area if good road access were developed in the area.[41]

For purposes of 404(c) and the 404(b)(1) Guidelines, the dredge and fill of wetlands to develop a Pebble mine and access to it, in combination with increased crowding, population and access, is likely to result in significant loss of sport fishing within the lodge, guiding and air taxi industries, as non-residents who seek trout at uncrowded, internationally famous destinations are displaced by residents who seek salmon and are more tolerant of crowding. That would simply shift expenditures of residents from one road-accessible destination (e.g., the Kenai Peninsula) to another (the Kvichak and Nushagak drainages), while displacing nonresidents, who account for so much of the sport fishing expenditures in the Bristol Bay drainages.

IV. Existence Value.

Although the focus here is on subsistence and sport fishing, the values of renewable resource services in principle should be available in perpetuity. Hence, EPA might consider what has been said about existence value of the Bristol Bay watersheds. According to Duffield, et al., a major unknown is the total value for existence and bequest (also called passive use values).[42] Subject to qualifications, Duffield, et al., estimate that the existence value of the watersheds is in the range of $6.0 billion to $10.2 billion.[43]

Sincerely yours,

Geoffrey Y. Parker

cc: Lisa P. Jackson, EPA, Administrator, Washington, D.C.
Phil North, EPA, Kenai, Alaska

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[38] Duffield, et al., at 55.
[39] Duffield, et al., at 58.
[40] Duffield, et. al, at 58.
[41] Duffield, et. al, at 61.
[42] Duffield, et. al, at 110.
[43] Duffield, et. al, at 112.

SUBSISTENCE, RECREATIONAL AND COMMERICAL USE VALUES: CONSIDERATIONS ARISING FROM THE 404(b)(1) GUIDELINES, AND WHICH BEAR UPON A 404(c) PROCESS

Prepared by Legal Counsel[1] for:

Nondalton Tribal Council, Koliganek Village Council, New Stuyahok Traditional Council, Ekwok Village Council, Curyung Tribal Council, and Levelock Village Council

May 2, 2010

This addresses potential impacts on subsistence, recreational, commercial and subsistence use values that are likely to occur from discharge of dredge and fill material in combination with other impacts related to a potential Pebble mine. Regulations at 40 CFR 231.2(e) provide that, for purposes of Section 404(c), an "unacceptable adverse effect" is defined in terms of an impact on an aquatic or wetland ecosystem that is "likely" to result in "significant loss or damage to fisheries . . . , or wildlife habitat or recreation areas." The regulations further provide that EPA should give consideration to the relevant portions of 404(b)(1) Guidelines. *Id.* [2]

The Guidelines state their purpose and policies. The purposes are "to restore and *maintain* the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material," and to implement Congressional policies expressed in the Clean Water Act.[3] The Guidelines establish a rebuttable presumption against allowing any discharge:

> Fundamental to these Guidelines is the *precept* that dredged or fill material should not be discharged into the aquatic ecosystem, *unless* it can be demonstrated that such a discharge will not have an unacceptable adverse impact *either individually or in combination* with known and/or probable impacts of other activities affecting the ecosystems of concern.[4]

The Guidelines further declare:

> From a national perspective, the degradation or destruction of special aquatic sites, such as filling operations in *wetlands*, is considered to be among the most *severe* environmental impacts covered by these Guidelines. The *guiding principle*

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[1] Geoffrey Y. Parker, 634 K St., Anchorage, AK 99501, ph. 907-222-6859; and Thomas E. Meacham, 9500 Prospect Dr., Anchorage, AK 99507, ph. 907-346-1077. Questions and comments are welcome.

[2] The 404(b)(1) Guidelines (40 CFR Part 230) are promulgated by the EPA in conjunction with the Secretary of the Army acting through the Chief of Engineers under Section 404(b)(1) of the Clean Water Act. 40 CFR 230.2.

[3] 40 CFR 230.1(a) and (b).

[4] 40 CFR 230.1(c).

should be that degradation or destruction of special sites [such as wetlands] may represent an irreversible loss of valuable aquatic resources.[5]

The Guidelines address direct, cumulative and secondary effects.[6] Cumulative impacts are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material.[7] Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material.[8] Information about secondary effects must be considered prior to a decision under Section 404.[9] Secondary effects may present issues of greater significance.[10]

The Guidelines address potential effects on human use of resources,[11] and previous EPA actions under 404(c) have done so.[12] In this instance, it helps to address use values, for purposes of 404(c) and the 404(b)(1) Guidelines, in at least two respects: (1) subsistence in terms of both economic value and state and federal statutes that seek to protect subsistence, and (2) recreational, commercial, and passive use value in terms of their economic values. It also helps to address employment generated by the salmon of the Bristol Bay watersheds. The most recent study of economic values associated with the salmon of the Bristol Bayd drainages is: John Duffield et al., *Economics of Wild Salmon Watersheds: Bristol Bay, Alaska*, listed in the Appendix.[13]

A. Subsistence and Environmental Justice.

The subsistence harvest of fish and game in the Bristol Bay drainages results in an estimated net economic value annually of between $78 and $143 million.[14] In those drainages, the share of the population that is Alaska Native is relatively high at 70 percent, compared to Alaska as a whole, with 16 percent.[15] Accordingly, subsistence is a major concern to the Tribes.[16]

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[5] 40 CFR 230.1(d) (italics added).
[6] 40 CFR 230.11.
[7] 40 CFR 230.11(g)(1).
[8] 40 CFR 230.11(h)(1).
[9] *Id.*
[10] *See e.g.,* 404(b)(1) Guidelines at 40 CFR 230.41(b) ("minor loss of wetland acreage may result in major losses through secondary impacts").
[11] 40 CFR Part 230, Subpart F.
[12] *e.g.*, USEPA, Recommended Determination of the U.S. Environmental Protection Agency Region IV Pursuant to Section 404(c) of the Clean Water Act Concerning the Yazoo Backwater Area Pumps Project (June 23, 2008).
[13] Mr. Duffield is a professor of natural resource economics at the University of Montana and is a co-author of the treatise: Ward, Kevin M. and John W. Duffield, 1992, *Natural Resource Damages: Law and Economics*, New York, John Wiley & Sons.
[14] Duffield, *et. al*, at 107 – 108.
[15] John Duffield et al., Economics of Wild Salmon Watersheds: Bristol Bay, Alaska 11 (2007).
[16] The Appendix to the Tribes's letter to EPA on 404(c) provides internet links to maps used by the Bureau of Land Management and which identify subsistence use areas for the villages and communities in the area that use the Kvichak and Nushagak drainages.

A Pebble mine and associated development and access are likely to increase competition for subsistence resources in the Bristol Bay drainages. At various times, the Pebble Limited Partnership (PLP) has predicted that a Pebble mine will require several thousand workers to build it, and a thousand workers to operate it, though the estimated number of workers fluctuates. Nevertheless, this increased activity will bring additional residents to the area in other roles, also. Even if mining permit stipulations could protect fish and wildlife habitat, significant increases in the number of local rural residents, in access demands, and in secondary development are likely to increase competition for subsistence resources. A Pebble mine may increase pressure (which already exists) to revise federal subsistence law to be protect only Alaska Native people, and to apply it more broadly than only on federal land (*i. e.*, to Native corporation lands also). Doing so would drive state and federal governments further apart on subsistence law.[17]

Most of the central provisions of State and federal subsistence laws were drafted nearly thirty years ago. Both provide two "tiers" of a subsistence preference (16 U.S.C. § 3114; AS 16.05.258), but they differ with respect to who can participate. Federal law limits subsistence on federal lands to *rural* Alaska residents. State law allows *all* Alaskans to qualify, preliminarily, for subsistence on non-federal lands.[18] Under both schemes, when the total harvest by subsistence and other users of a fish or game stock exceeds sustained yield, the Tier I preference restricts or eliminates nonsubsistence users. When the subsistence harvest alone exceeds sustained yield, the Tier II preference is triggered and subsistence is restricted by statutory criteria that allocate subsistence opportunities. On federal lands, 16 U.S.C. § 3114 allocates subsistence opportunities by three criteria: (1) customary and direct dependence on the populations as the mainstay of livelihood; (2) local residency; and (3) availability of alternative resources. The State, however, must avoid local residency criteria as being unconstitutional under the Alaska Constitution. These distinctions in who can hunt and fish in particular situations have divided Alaskans and are known colloquially as the "subsistence dilemma."

Pebble mine, and all agencies involved in an EIS on Pebble mine, are likely to be caught upon the horns of this dilemma, because the Bristol Bay drainages (unlike locations of other large mines in Alaska) are the source of world-class fish and game resources (*e.g.*, salmon, trout, char, grayling, pike, lake trout, caribou, moose, and bears) that attract users locally, regionally, nationally, and internationally. No other large Alaskan mine is located in a region that does so.

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[17] Congress probably could adopt a "Native only" subsistence provision under the Indian Powers clauses of the US Constitution, but the Alaska legislature cannot do so under the Alaska Constitution. This distinction between federal and state constitutional powers may create pressure on Congress to redefine subsistence as for "Natives only" and then perhaps to protect and regulate subsistence on both federal and Native lands. This would be very divisive among state residents, but a proposed Pebble mine is likely to add to pressures to do so. The only alternative to such a course may be state legislation that establishes a state fish and game refuge or critical habitat area on most state lands in the Kvichak and Nushagak drainages. Such legislation would have to be carefully drafted. Its probably would have to be drafted to (1) protect habitat and commercial, subsistence and recreational uses, *including* "productivity" for subsistence users, and (2) allow a Pebble mine only if compatible with these purposes.

[18] *McDowell v. State*, 785 P.2d 1 (Ak. 1989)(Alaska constitution bars State from limiting subsistence to rural residents).

Because of this distinction, Pebble and associated development are likely to increase the number of new local rural residents, visitors from Alaska and perhaps elsewhere, and secondary development.[19] Because of the pattern of land ownership, new local residents are likely to settle in the vicinity of Iliamna, Newhalen and Nondalton. However, their uses of lands and resources will reach beyond, to state lands in the Kvichak and Nushagak drainages (and to private land, including Native land, with and without permission) where state subsistence law applies, and to federal land (Lake Clark and Katmai nationals parks and preserves, and BLM lands) where federal subsistence law applies. The Pebble Partnership may restrict fishing or hunting by employees while at the mine site, but it cannot limit the development of private land, or the activities of new local residents who are either not its employees, or are visitors. Even well-intentioned restrictions on access to protect subsistence uses of resources tend to be transitory and ineffective (*e.g.*, the Dalton Highway, formerly "the North Slope Haul Road" is now open to public use).

With respect to federal law, the *new* local residents will be *rural* residents for purposes of subsistence in federal parks and preserves and BLM lands. They will compete with *current* rural residents and visitors. This has implications for the EIS and Tier I and Tier II subsistence preferences under state and federal subsistence laws. First, as the *total* number of rural residents increases, the Federal Subsistence Board is likely to restrict or eliminate sport hunting in the federal Lake Clark and Katmai Preserves where sport hunting has been allowed. Second, when subsistence demand of all (new and current) rural residents surpasses sustained yield of a fish or game population (most likely a game population) on federal land, some rural residents will be disqualified under the criteria at 16 U.S.C. § 3114. However, the local-residency criterion will not be particularly effective, because new and current rural residents will *all* be "local rural residents." The first and third criteria – *i.e.*, (1) customary and direct dependence as the mainstay of livelihood; and (3) availability of alternative resources – will disqualify some subsistence users on federal lands, not unlike the disqualification that occurs under the State's divisive and controversial Tier II hunts. Hence, *current* rural residents may experience increased competition, diminished subsistence opportunity, and disqualification on federal lands, because of an influx of *new* rural residents.[20]

With respect to state subsistence law, conflicts are likely to be more intense because all Alaska residents can qualify for subsistence on nonfederal lands. Some game populations, such as Mulchatna caribou and Nushagak moose, may have to be managed as Tier II state subsistence hunts, in which all sport hunters and many subsistence hunters would be excluded.

Thus, because the population in the Bristol Bay drainages is substantially Native Alaskan, a Pebble mine (or similar mines) is likely to have disproportionately high, adverse, *secondary*, environmental effects on subsistence use by Alaska Natives. This raises issues of environmental

[19] For reasons not addressed here, additional visitors may not result in more commerce, because resource and industrial development may alter recreational trip durations, expenses, activities and visitor demographics.

[20] None of this implies that impacts of population are limited to subsistence. For reasons not addressed here, commercial and recreational fishing may also suffer impacts arising from increased population.

justice under Executive Order 12898. It requires that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on low-income and minority populations. Again, the Yazoo Backwater Area Pumps Project (see fn. ___, supra) provides a useful analogy. In that case, EPA concluded that the project would have disproportionate adverse environmental effects on low-income and minority populations, and that a 404(c) decision to bar the project would not.[21]

B. Recreation.

For purposes of Section 404(c) and the 404(b)(1) Guidelines, EPA may consider the quality of recreational use and economic impacts resulting from changes in recreational use patterns.[22]

Since the mid-1980's, several studies have addressed recreational use, chiefly sport fishing, in the Kvichak and Nushagak drainages. The most recent is John Duffield et al., *Economics of Wild Salmon Watersheds: Bristol Bay, Alaska*, listed in the Appendix. Generally speaking, the studies have found or implied that two factors drive recreational expenditures to acquire the services of remote fishing lodges in the Bristol Bay drainages: (1) desire for large rainbow trout as a target species, ahead of king salmon, silver salmon and other species, and (2) concern about crowding.[23] Approximately 73 percent of sport fishers in the Bristol Bay drainages for whom the primary purpose of their trip is sport fishing are non-Alaska residents.[24] Most of the lodges and other services, such as air taxis, are in the Kvichak and Nushagak drainages.[25] By contrast, sport fishers on the Kenai Peninsula are relatively more likely to be Alaska residents, more likely to pursue salmon, and less concerned about crowding.[26]

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[21] USEPA, Recommended Determination of the U.S. Environmental Protection Agency Region IV Pursuant to Section 404(c) of the Clean Water Act Concerning the Yazoo Backwater Area Pumps Project, 65 – 67 (June 23, 2008).

[22] *See e.g.*, USEPA, Recommended Determination of the U.S. Environmental Protection Agency Region IV Pursuant to Section 404(c) of the Clean Water Act Concerning the Yazoo Backwater Area Pumps Project (June 23, 2008) (portions address potential changes in quality of, and economic benefits derived from, fishing and hunting in the Yazoo Backwater Area).

[23] Duffield, *et. al*, at 46 – 48 (large rainbow trout viewed as over 26 inches in Duffield survey). *See also* David A. Ackey, "An Economic Evaluation of Recreational Fishing in Bristol Bay, Alaska," Masters Thesis, UAA/Juneau (1988) (focuses is on Kvichak and Naknek drainages and includes Iliamna Lake area); Jon Issacs and Associates, "Commercial Recreation Service Providers Study" (1986) for Bristol Bay Coastal Resource Service Area (focuses on Nushagak/Mulchatna drainage).

[24] Duffield, *et. al*, at 45 (*i.e.*, the sport fishers were from around the nation and the world).

[25]

[26] *See*, Duffield, *et. al*, at ___; *see also*, ADF&G, Fishery Data Series, No. 09-47, "Estimates of Participation, Catch, and Harvest in Alaska Sport Fisheries in 2005, 37 (non-residents generally account for less than 50 percent of angers, from 2000 to 2005, in all of Southcentral Alaska, which includes the Bristol Bay drainages in Southcentral Alaska.) Duffield found: "Generally those anglers fishing the road-accessible Kenai Peninsula, for example, were less concerned with issues of angler crowding and fishing remote roadless areas than were Bristol Bay anglers.

Duffield addresses potential development within the area that could result in road access (by ferry from Homer, Alaska) and thus would impact crowding and size and abundance of rainbow trout in the region. The survey result indicate that 45.4% of non-residents and 30.5% of residents feel that the road access would cause them to either stop fishing in the Bristol Bay area (and fish other areas of Alaska) or stop fishing in Alaska entirely.[27]

C. Commercial Fishing.

The "economic value" of commercial salmon fishing in Bristol Bay can be estimated by various values, such as ex-vessel value, expenditure value, wholesale value, net profit, etc., in various geographical contexts, such as a local, regional, or national economy. Duffield estimates the wholesale value in 2005 in the regional economy at $226 million.[28]

D. Employment.

Economic value can also be addressed in terms of employment. The following table reflects the distribution of full-time-equivalent jobs, per Duffield, et. al, at 17.

Total Full Time Equivalent (FTE) Employment in Alaska Dependent on Bristol Bay Wild Salmon Ecosystems, 2005:[29]

Sector	*Alaska Residents*			*Nonresidents*	*Total FTE jobs*
	Local residents	Non-local residents	Total Alaska		
Commercial fishing	689	667	1,357	1,172	2,529
Commercial processing	465	449	914	796	1,710
Sport fishing	288	435	723	123	846
Sport hunting	60	105	165	2	167
Wildlife viewing / tourism	82	139	222	17	239
Subsistence	14	34	49	0	49
Total FTE jobs	1598	1829	3,430	2,110	5,540

E. Existence Value.

Since the values of renewable resource services in principle should be available in perpetuity, EPA might consider what has been said about existence value of the Bristol Bay

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These findings are consistent with the general finding from Romberg (1999), that there are different market segments of Alaskan sportfishing, and that different types of waters attract different types of anglers." Duffield, *et. al*, at 43.

[27] Duffield, *et. al*, at 58.

[28] Duffield, *et. al*, at 16.

[29] Hunting is included because wild salmon returning from the sea perform an "ecosystem service" of nutrient recycling to support habitat functions. *See id.* at 24-26. In Alaska, marine nitrogen accounts for as much as 90 percent of the nitrogen in brown bears. See Robert J. Naiman et al., Riparia: Ecology, Conservation, and Management of Streamside Communities, 184-185 (2005).

watersheds. According to Duffield, et. al, a major unknown is the total value for existence and bequest (also called passive use values).[30] Subject to qualifications, Duffield, et. al, estimate that the existence value is in the range of $6.0 billion to $10.2 billion.

[30] Duffield, *et. al*, at 110.